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Inside View of the Cold Grapery of J. C. Green, Esq., Staten Island.

THE

COLD GRAPERY,

FROM

DIRECT AMERICAN PRACTICE:

BEING

A CONCISE AND DETAILED TREATISE ON THE CULTIVATION OF THE EXOTIC GRAPE-VINE, UNDER GLASS, WITHOUT ARTIFICIAL HEAT.

BY

WILLIAM CHORLTON,

GARDENER TO J. C. GREEN, ESQ., STATEN ISLAND, N. Y.

NEW-YORK:

J. C. RIKER, 129 FULTON-STREET.

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PREFACE.

INDIVIDUALLY it becomes our duty to render to collective society what benefit we can in our respective and various positions.

As there is at this time a great number of graperies (without artificial heat) in the course of erection, and many others in operation, and withal, as public attention is fairly aroused on the subject, whether or not they will answer, and as there is much failure existing, and likely to continue to exist, without more practical experience: It appears to me, a duty owing to the horticultural part of the community, that some one should step out and render assistance in fanning the flame and directing it into the proper course. I have waited for some time, thinking that some more eloquent mind would take up the subject; but as it has not to my knowledge been hitherto done in a sufficiently detailed manner, I have been induced to collect into one small focus, what practical experience I possess, hoping that what is recorded may be

of use in assisting the amateur and inexperienced, and of proving, that the exotic grape-vine can be successfully grown to perfection, without the aid of artificial heat. I admit, that a temporary heating power, early in spring, gives the operator a greater control, but the thing can be successfully and satisfactorily carried through without it, as I have convincingly proved in practice.

To literary talent I aspire not, but *stand responsible* for the practice and what few scientific observations occur. The following pages are the penning down of a few "evenings at home," of the scattered and integral portions of my own practice. There is nothing laid down, but has been found to correspond with what is recorded. It would have been easy to swell out the size of the book, by quoting European authors, and giving European practice, but this has been purposely avoided, and there is no occasion for it in a practical monograph of this character. *The whole is adapted for, and has been experienced in the United States, and is strictly suited to the climate.*

Such as it is, I submit it to an intelligent and indulgent public. Feeling assured that the good intentions will counterbalance the want of lofty phraseology, and shield me from the cutting rebuke of the censuring critic.

THE COLD GRAPERY.

CHAPTER I.

Introductory Remarks—Native Grapes, Exotics, their hardiness—Effects of Mildew—Price of Houses—Atmosphere, Heat, Light, and Moisture—Evils of Ignorance—Skill readily acquired—Acclimatization—Adaptation to Culture—Advantages of the Grapery.

We find from history that the Grape-Vine has been one of the most esteemed and essential fruits from the most remote periods of antiquity. Its cultivation has followed the migrations of civilized man into all climes suitable to its prosperity, and since the erection of glass-houses has become adopted into many countries, where it otherwise could not succeed.

In the United States, the different varieties of Vitis Labrusca, as Isabella, Catawba, &c., and those of Vitis vulpina, as Scuppernong, Charter Oak, &c., with ordinary treatment, flourish and

ripen their fruit in the open air; while those of Vitis vinifera, as Chasselas, Hamburgh, &c., have, excepting in a few solitary instances, proved a complete failure from their tendency to become mildewed. In most parts of the Union, there is sufficient light and heat to bring the fruit to maturity, and the plant is hardy enough to resist the cold; but unfortunately when the disease (allow the expression) attacks it, the free action of its growth is checked, its energies become impaired, and at the close of the growing season, it has consequently not perfected its growth, and has nothing but sappy unripened wood to withstand the severe winters. The fruit also is rendered worthless from the same cause. Many attempts have been tried with the most sanguine expectations, and have as often been abandoned.

This evil is the result of the growth of fungoid vegetation, the development of which is accelerated by the excessive changes from dry to moist, from heat to cold, and vice versa. Fortunately, the erection of glass-houses is now so well understood, and material is so cheap, that we have a ready antidote; for by planting inside these structures, we are enabled to equalize the temperature and overcome the difficulty.

There is also the advantage of being enabled to cut ripe grapes much earlier, and during a longer period, from the same crop; for the varieties are so numerous, and their times of ripening so different, that with a proper selection, grapes may be had in a cold house from the middle of July, or the beginning of August (according to locality), on to near the end of December.

Generally it has been thought that the cultivation of this desirable fruit was prohibited to all but the most wealthy, on account of expense and peculiar mysterious skill. As to the first difficulty, good and suitable houses can be erected at from $8 to $12 per running foot, on the length of the house, all conveniences included, and proper fertilizing materials are no great expense, so that this obstacle can be removed even by those of humble means; and by following the directions here laid down, the skill part (with a little observation added) is soon acquired; for these directions are the result of practical experience, and are only what have been, and are still being actually accomplished by good grape growers. Many have been prevented from commencing, by seeing the many failures that have occurred, the small number of successful cases, and the hitherto almost general "say," that it was abso-

lutely necessary to have fire heat. But we are dawning upon a new era in this respect, and the alacrity and enthusiasm with which many are now entering the field, will go far to dispel these fears, and drive out prejudice. No fruit-bearing plant will give greater satisfaction if attended to, and nothing *horticultural* will continue to prosper without it. All that is wanted is a few right ideas, and the writer has done his best to discharge his duty, feeling convinced that, ere long, the grape-house will be considered as necessary an adjunct to an estate, however small, as is a peach orchard.

The exotic grape-vine is a native of, and flourishes the best in warm, even, and comparatively dry climates; its organization is so constituted as to require a long, steady, and warm season to perfect its growth. Under favorable circumstances, it pushes forth a great amount of development, and absorbs a large quantity of nutriment from the soil, if encouraged to the full extent of its powers. The broad and ample foliage perspires and respires very freely. Hence it follows, that the atmosphere in which it is growing, should be most particularly adapted to the various stages of progress. Practical experience shows this to be decidedly a fact; for,

when not attended to, the most injurious consequences follow.

Heat is the cause by which the sap is set in motion in spring, and when once excited, action is gradually increased with the rising temperature, and eventually, the whole energies of the plant are brought into active play. Light and moisture, combined with heat, are essential to its welfare; they encourage this action, and enable the plant to develope and mature its growth to the fullest capacity. This being the case, it is easy to see, that in so vigorous a grower as the grape-vine is, a great amount of these three elements are required. This I would most particularly impress upon all grape growers. Heat, light, and moisture, are the main requisites: these elements are generally too sparingly administered. The grape-vine requires them all in abundance while growing freely.

It would be well if all cultivators were to study more closely than many do, the laws by which the vegetable world is governed: were it so, there would be less failures. We are attached too much to set notions, and follow the blind practice of prejudice oftener than we ought. Add to this the great number of pretenders who swarm over the country, and there is no wonder

at the many failures. Let it not be thought that I wish to depreciate the character of the skilful horticulturist; for we have many men in the country who are an honor to the calling, well qualified to give advice, and under whose care, the grape-vine is as well managed as in any part of Europe; but while wishing to do all in our power to uphold the profession, we should not lose sight of the duty of raising our voices against those egotistical empirics, who often deceive the unwary, waste the property of those who employ them, and bring ruin to many a horticultural establishment. In no department is this more often seen than in the grapery, where the weak growth, the ill-fed papery leaves, and spare fruit, tell a woful tale of mismanagement. Yet no fruit-bearing plant yields more readily to the wishes of the cultivator, or will bear more ill treatment; and if other fruits were managed as artificially as it requires to be, there would be in them more failures than it is subject to under inexperienced hands.

Although there is some skill required in the cultivation of this fruit, there are none of those nostrums, or mysterious dogmas, that these quacks prate about, and that skill is readily acquired. The main secrets are, to understand its

constitutional habits, and adapt our treatment accordingly. Now if we take into consideration as stated above, that the grape-vine is indigenous to, and flourishes best in, those countries that have long and steady summers, and that those same localities are comparatively dry during the periods of rest; it follows, that we must keep up a warm and steady temperature during growth, and have the roots in a well drained or naturally dry substratum; so far for its natural requirements. All that we have so far done, by attempting to acclimatize, has not yet got over these physical desiderata; neither will any future attempts, *unless we get a race of seedlings, crossed with the hardy varieties, and raised in our own climate.* By encouraging too its vigorous development, by a moist atmosphere added to this steady heat, and afterwards concentrating the collected juices by a further continuance of the same element, and air more freely admitted until the approach of maturity, afterwards reducing the temperature and moisture as ripening progresses, and until it goes quietly to rest, it will bend to the will of the most fastidious enthusiast.

By the aid of the Cold Grapery, and well drained and fertile borders, all this can be accom-

plished, and as houses can be erected of any size to suit the pecuniary means or caprice of different persons, a grapery is within the reach of the poor man. How gratifying would it be to the mechanic and small tradesman, to have attached to his homestead a small house of grapes. What an appendage to his little domain, and with what exulting feelings would he view his crop, as "he sat under his own vine," and watched, with an enthusiastic pleasure, the several stages of flowers and fruit, knowing that he could enjoy his own luscious grapes, equal in quality to those of the most wealthy proprietor in the land, or the greatest nabob in aristocratic Europe. This pleasure may be enjoyed by most persons; *half the money that is often spent in gimcrackery and gingerbread decorations, miscalled ornaments around a dwelling-house, would erect a little grapery*, which in many places, might be attached to or cover one end of the building, having a door leading into it from the house; and let not the wife or daughters think it degrading to attend to it in the absence of the "gude man," for it is no mean occupation; their health will be thereby benefited, and with the following directions before them, there will be no difficulty. Woman never yet lowered herself by obtaining a knowl-

edge of the cultivation of plants and of rural affairs; it tends to ennoble and expand the mind, softens down the asperities of temper, and produces domestic associations, when love and affection are strengthened, and made more permanent.

CHAPTER II.

Houses and Conveniences—Curvilinear, Double Pitch—Straight Line, Double Pitch—Straight Line, Single Pitch—Curvilinear, Single Pitch—Ridge and Furrow—General Remarks on Position or Style—Inclination of Roof—Foundation—Ventilation—Interior Fixings—Situation.

THERE has been, from time to time, much controversy respecting the various kinds of structures that are most suitable generally for cultivating the grape-vine. Some advocate the curve line, double pitch, fig. 1; others again, the straight line, double pitch, fig. 2. Some, from a feeling of hanging on to old notions, think none so suitable as the common lean-to, fig. 3; while a few, who have advanced a step out of this position, will admit of the common plane lean-to, having a curve line, fig. 4. Latterly, a new notion has sprung up, and we find the ridge-and-furrow-formed roof, fig. 5, is becoming the order of the day.

If early forcing is the object, none are more suitable than houses well protected by close

walls on the northern side, when the different forms of lean-to are the most economical, a good pitch being given to the roof, so that the sun's rays in winter may strike perpendicularly to the plane of the roof, with the lower part of the

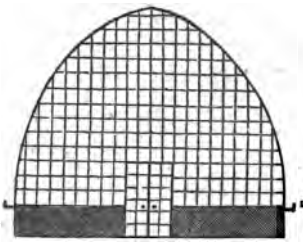


Fig. 1.

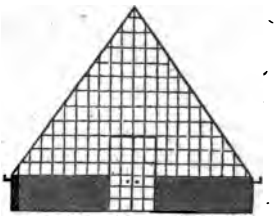


Fig. 2.

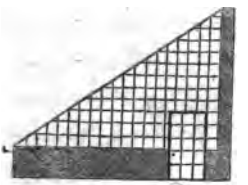


Fig. 3.

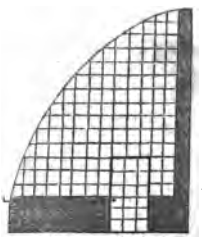


Fig. 4.

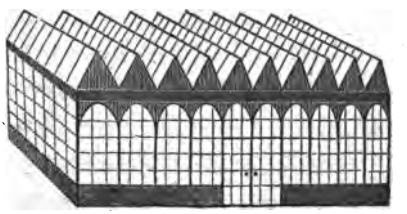


Fig. 5.

rafter resting near to the ground level; as then there is but little cubic bulk of air to be heated, and the house is better sheltered from cold winds. But with cold houses, with which we have at present to do, these peculiarities are not so requisite, as our main object is only to equalize the temperature, and maintain a steady heat during the time when nature will supply our wants in this respect.

The form of house is not so material as the having it so constructed as to shut up tight in cases of emergency. With this precaution, good glass, and good management, any style will answer the purpose to almost equal advantage. If there is any preference, the curvilinear ought to be chosen, as from the convex surface exposed to the sun's rays (at whatever altitude he may be), it somewhat scatters the intense heat; there is less tendency of the leaves burning, and the light is also more equally distributed: this form, too, is generally considered the most handsome.

Whatever style of double pitch is used, the ends ought to face north and south, or as near these points as is convenient, although a few degrees off either way is not of much consequence. By placing the house in this position, both sides

receive the influence of the sun about equally; besides in the middle of the day, when his rays are most intense, they are partly warded off by striking obliquely upon the sash bars above, which on the whole length of the house, act as considerable shade.

In some cases, it may be desirable to cover a dead wall, or side of a building; or requisite that the cold grapery should form part of a line of early forcing, or plant houses, when the lean-to roof will be most convenient; but there is no other advantage in adopting it, for with double pitch, and likewise two rows of pillars inside, one on each side of the central pathway, both sides may be planted, thus accommodating a double quantity of plants: besides, there is no back wall seen, and it shows better taste in the proprietor. Where expense is an object, it is also the cheapest, considering the number of vines provided for. Where the lean-to is adopted, the southeast, or southwest aspect is best; though full south is not objectionable, and grapes may be well ripened when the house faces due east or west. Further north than these two points cannot be considered suitable, excepting as a retarding house, in which there ought to be heating apparatus, for the purpose of ripening

off the grapes. But our present purpose is with the cold grapery without artificial heat. In case it may be wished to have the grapery correspond with some peculiar style of architecture in the dwelling-house (and these points ought often to be considered), the ridge-and-furrow roof offers the greatest facilities, as it may be adapted to almost any form without destroying its efficiency, for the vines can be trained horizontally under the roof: the grapes also look very handsome in this position, as they hang perpendicularly down over the whole surface above. The canes may be conducted along the under surface of each furrow, and the side spurs fixed at right angles, which enables the operator to arrange the bunches with the nicest regularity.

With respect to the inclination of the roof, I think it desirable not to be less than 45°, for the following reasons: our almost vertical sun at midsummer, when there is the greatest danger of scorching, will, at mid-day, strike the glass at an oblique angle, and a portion of its intensity will glide off, thereby decreasing the danger. The glass being more upright, the wind or draught admitted through the laps will be somewhat intercepted, and will be confined more immediately to the inner surface of the roof, which will in-

sure a more equable temperature around the leaves and stems, preventing somewhat the tendency to mildew. A steep roof also gives an additional length of rafter on a limited width of house, which is an advantage, as the vines, with the general modes of training, have more extent to develope their energies, and produce individually greater crops.

When the grape-vine is to be grown to the greatest perfection, the house ought not to be applied to any other purpose. If plants are housed in the same structure during winter, it is requisite to take them out previous to the vines bursting, and before it is safe to remove the plants into the open air; as then the vines will require a temperature peculiar to themselves, and which would generally be too damp and close for the plants, many of which will be in a blooming state, requiring more air and a cooler atmosphere than will be suitable to the vines; besides, it is almost impossible to keep down insects in a house where plants are kept. As a plant house requires heating, and a cold vinery does not, the expense of two houses is not so great, compared with the advantage to be gained; therefore, if possible, it is much better to have both separate where both are wanted. If pecuniary bene-

fit is an object it is also more profitable; for the grape, if well done to, will be honest in return, and pay a large percentage upon capital, independent of ordinary expenses of labor, &c.; but when neglected the reverse is the case.

In order to give free range to the roots, it is advisable to erect the house upon stone pillars, or locust or cedar posts, which will allow them free egress to the outside borders.

There are several ways by which these houses may be ventilated; perhaps the most convenient is to admit air at the top, and near the bottom, or under the wall plate. The lower opening ought to be made so as to shut up very tight, as the admission of cold draughts from below has a tendency to reduce the heat in the lower base of the house, the very part which, if possible, ought to be the warmest. Nature here teaches us a lesson, and it were well if we would always give ear to her instruction. She has no fixed confining canopy over the plants under her charge to prevent the heat passing upwards, and if we are obliged to have such, we ought not to render our necessities more unnatural than there is occasion for. Keep the head cool and the feet warm, is advice often given by our physicians, and the same rule applies to plants generally, with very slight modifications.

If the roof is made with sashes to slide over each other, which is the best adapted for removal of the house at any future time, the upper ones will become the top ventilators; but when it is fixed, and composed of a continuous row of sash bars over supporting rafters underneath, the openings require to be lifted up from the bottom, and hung on the opposite end by hinges, or suspended by the middle on each side, and opened on a pivot. When suspended by hinges, the sides may rest upon the rafter, and the opposite end project a little over the next squares of glass, thereby making it proof against drip; and this is perhaps the best plan, for besides being safer against rain, air can be admitted and the temperature lowered, without cold draughts striking down into the house. If hung from the sides there are no effectual means of capping, and however good the joints may be, the rain will find its way through more or less, in time of violent storms.

The internal fixings required, are wires to support the vines, a tank to hold water, a hose with a pipe attached to distribute the water over the house, and a force-pump to supply the hose. The wires ought to run parallel with the sash bars, and about fifteen inches below the glass,

which will be sufficient to clear the leaves from contact; if less space is allowed the leaves of vigorous vines will touch the roof, and are more exposed to the changes of temperature; their action also will be impeded by being cramped. A greater distance than is actually required is objectionable, as the nearer the glass the better.

For a large house, a tank sufficient to hold about two hundred gallons will be requisite, and, for a small house, one in proportion. This tank ought to be kept full of water, so as when used it may be of the same temperature as the house. *Cold water applied immediately from an underground cistern, suddenly checks the action of the plants*, and ought by all means to be guarded against. The force-pump may be attached to the tank, and if an air-tight globe is fixed over the discharge pipe, on the same principle as a fire engine, a steady stream will be propelled through the hose. By having two taps on the lower pipes, one leading to the tank, and the other from the cistern below, there is no need for two pumps, as they may be shut and opened, so to answer the double purpose of drawing water from the cistern, and distributing it from the tank over the house. For a small house where expense is an object, a common syringe may be

used instead of the hose; but in a large house the force-pump is more economical, and has the advantage of enabling the operator to drive the water well into all crevices of the wood-work, which greatly assists in keeping the house clear of insects.

If there is not a good supply of soft water close at hand, it is desirable to have a cistern sunk under or immediately near the house, and the water conveyed into it from the roof by gutters and pipe, which saves much labor; besides the benefit of always having rain water, which is the best for all plants.

The situation of the house is a matter of some importance, and in making arrangements ought not to be lost sight of. It should be freely exposed to light and air on all sides if possible, away from the shade of trees or surrounding buildings, and if sheltered on the north, east, and west sides, so much the better; but it is best for this to be a sufficient distance, so as to secure a free action of the air around. Shelter is not indispensably necessary, but if practicable is of use, as it assists in warding off the cold winds, which often prevail till late in spring, and after the vines have begun to grow.

CHAPTER III.

Borders—Evil effects of Animal Matter—Deep and over rich Borders—Gorged Luxuriance—Medium well-ripened Wood best—How to make Borders—Advantages of good Drainage—Top Dressings and Mulching—Suitable Materials—Saving of Expense.

THE formation of beds, or more technically borders, in which to grow the grape-vine, is of great importance; perhaps more so than any other portion of the whole routine of culture, for without a proper matrix for the roots to luxuriate in, it is impossible to succeed.

The more important is any branch of horticulture, and often the greater the number of opinions respecting it. This is strictly true in the present instance. Some have advocated the admixture of great quantities of raw animal carcasses in such quantities, and large masses, that one would think if their reasoning were true, a recently filled cholera burial-ground would be the best place on which to erect a grapery. Others again have recommended as large doses

of blood and the stinking offal of slaughter-houses, in so fresh a state, that the very idea is enough to nauseate the strongest appetite, and forbid the cultivation of this luscious fruit. Fortunately these materials are not required, although when thoroughly decomposed, and well mixed with maiden earth, there is no objection to using a portion well incorporated through the mass. It often happens when thus applied that a very vigorous growth is produced for a time, but sufficient vigor can be had without these stinking nuisances. If used at all, it should be in the form of top-dressings in after years, and forked in, by which the fertility will be assisted, without making the whole bed an unctuous paste, more fit to puddle a duck pond than for the tender and fleshy rootlets of the grape-vine to luxuriate in. If proof of this were wanted, there are plenty of examples if examined, where the roots have come in contact with these masses of soapy-like substances, that will be found quite rotten; and if the vines have continued to do well, it is not from the nutriment derived from them, but from their ready adaptability to form fresh spongioles from the back roots, which travel in other directions, and with good treatment added.

If success has seemed to attend the progress in some instances, the failures have been comparatively much greater; and I am convinced from experience, that more injury than benefit will be the result from the admixture of animal matter, even in small quantities, in any thing like a fresh state.

Some again make the beds from three to four feet deep of otherwise suitable materials, and use such quantity with insufficient drainage, that the whole mass after a time becomes sodden, and impervious to either sun or air, in which no root can exist, much less extend itself: these are some of the many causes why our graperies so soon become weak and unproductive. The natural constitutional powers of the grape-vine are very strong, and of great longevity; it is a gross feeder, and can absorb a large amount of food; but when thus maltreated, although it may bear such usage for a time with much pertinacity, it will in the long run (like an over-gorged glutton) become deranged, its physical functions will be weakened, and it either dies of plethora, or wears on an exhausted existence, producing little or nothing but watery leaves and weakly branches.

If such very strong growth were really re-

quisite to produce the finest bunches or berries, and could be obtained by these means, there would be some excuse for thus abusing nature; but such is not the fact, for the most superior and best flavored fruit, is had from solid, well-ripened and vigorous, but not over-gorged wood. When the bearing shoots are unduly strong, there are frequently two or more developed from a bud, while with moderate growth only one is formed. Now as each of these buds having received its share of nutriment wherewith to start future development, thus takes from the others a portion, the consequence must be (as only one can remain) a weaker start, and less capability of bursting with the same energy, which would be the case, if the bud had only one centre. The bunches emanating from such a bud will also contain generally a greater number of florets and shoulders, equal to the concentrated accumulation in the embryo shoot; for it is formed previous to bursting, and before the leaf of the previous season falls, in the axil of which it is fixed.

In all cases of permanent success, the exotic grape-vine luxuriates upon a natural or artificial well-drained bottom. It is a native of warm and comparatively dry climates, and the constitution which nature has fixed, man cannot alter. We

must then adapt, as near as we can, its position in cultivation to its wants, and if we produce artificially a greater than ordinary amount of growth, we ought to have a corresponding medium whereby to mature that growth. Well-drained borders is one means by which this can be accomplished, as the superabundant moisture is taken away, and the air and the sun's heat can more readily penetrate the soil. If the following directions are followed, there will be no reason to complain of want of success on this point.

Take out to the depth of two feet the whole of the upper surface, then dig a trench two feet wide and one foot deep, with one or more outlets for the water to escape all around the margin of the excavated space, which will form a drain three feet deep from the top, and one foot below the lower base of the borders. Fill this trench with rough stones or brickbats, the rougher the better; afterwards fill in over the whole surface, about six inches of oyster, or other marine shells, if to be had readily; but if not, broken stones, or pieces of brick will answer; and if a few clean broken bones are at hand, strew them over the surface of the other drainage. Cover this with turf sods, or any

rough litter, to prevent the soil falling through and amongst the dranage. Next fill in with the prepared compost to one foot above the top level; this will give a depth of two feet six inches, which will sink down about six inches, leaving the permanent depth two feet, viz., eighteen inches below, and six inches above the ground level.

In some situations the original base will be a dead level. In such cases, the excavated base ought to slope from the house towards the outside of the borders, which will cause the water to run the more readily towards the lower drains. Care should be taken in this respect, whatever the level may be, that the bottom is so arranged as to allow the water to escape freely; the means of securing which will occur to any ordinary mind according to the level he may have to deal with.

It may be thought that with this amount of drainage, and raised and not deep borders, the soil will become too dry through the summer to maintain vigorous growth. From experience I can testify to the contrary, for although the bottom will not be over wet, the moisture will be equally divided through the whole mass, and if mulched, examination will prove that every

part is equally damp. The innumerable small rootlets will be ramifying in every direction, each taking its allotted portion of work, to supply the structure of the plant with wholesome food.

Although it is recommended above to make the whole of the borders at once, which is only one trouble and expense, and will answer very well; yet it is much better to prepare the drainage as advised, and make only half, viz., that part next to the house, of properly prepared compost, filling in the other with the intended base soil a little enriched; and after the first season's growth, work up in the following fall into the half of the unfinished portion, the same quantity of fertilizing materials as the former half was mixed with. In the spring, before growing commences, this may be again forked over, which will incorporate all more evenly; and the next fall doing the same with the remaining quarter. By this method the borders are kept loose for a longer time, the air is more freely admitted, and the whole becomes more fitted for the healthy progress of the roots, which, as they extend from year to year, will penetrate more readily and fill every portion. The tendency to become solid is much reduced after the borders become filled with roots, as they are always more or less

drawing nutriment and moisture, thereby rendering the soil more porous, when the gases of the atmosphere, which are very beneficial, have a chance of occupying the interstices, and forming chemical combinations with the material body, which then becomes suitable food for the support of vegetable life. We have ample proofs of this argument, and where borders are constructed as above advised, there will be an admission of air, not only from the openings to the drains, and from them under the whole bed, but also from above.

It is not by administering such enormous doses of stimulating or fertilizing material all at once, and before the roots have progressed in sufficient numbers or distance to appropriate it to their use, that we are to calculate upon the most permanent results or immediate success. So long as we supply from time to time what is required; it is enough; and if we have got well drained and porous borders, we can the more readily apply top-dressings and mulchings in after years, without injury, or covering the roots too deep: for in well-drained ground, if a layer of dung be spread over the surface, it will be found after a time that there is little but dry chaff left; all the soluble parts have been wash-

ed by the rains down into the soil below, and the plants have received the benefit of it.

The most suitable materials for composing the borders, are a good friable loam (the top sod grass included of a pasture), with a suitable portion of well decomposed stable manure, in proportions of one-fourth of the latter to three-fourths of the former, and a good dressing of bones, ground to about an inch in diameter, say one bushel to every cubic yard in bulk. If the soil contains much lime in its own base, the bones may be dispensed with; but generally they are of much benefit, being a very lasting manure, giving out slowly; and when all the phosphates are exhausted, they still remain as a carbonate of lime, amongst which the grape-vine delights.

When the base soil where the house is to be erected is of the above nature, it may be used, and the other materials added on the spot, which will save much expense. There is often much useless expenditure caused in this way. Never remove away the existing base unless absolutely bad, excepting with little expense a much better substitute can be procured; for with good mixing of the fertilizing matter, and drainage to correspond, a poor base can be made good, and often when it is considered impracticable, as good as

can be required. Imperfect drainage is many times the cause that prevents success, when it is attributed to an unsuitable constituent base. *The grape-vine is not so capricious in its food as is generally supposed, but a dry bottom it must ~~and will~~ have to prosper.*

CHAPTER IV.

Planting—How to choose suitable Vines—Descriptive List—Best twelve, six, and two kinds—Muscat, Remarks on—Time of planting—How to plant—Application of Water—Evil of planting started Vines too early.

In choosing vines for planting, see that the wood is well ripened and solid, and the roots clean and healthy. One year old, propagated from the eye are best; but two year old are not objectionable. The following descriptive list of twenty-four varieties contains most of the best and most suitable sorts for the cold grapery.

Black Hamburgh. Berries large, black, flavor full and sweet. Bunches large, compact, and well shouldered; altogether first-rate, ripe last week in August.

Victoria Hamburgh. Similar to the above; when true, berries large and blacker; first-rate, ripe last week in August.

Wilmott's Hamburgh. Berries large, very black, appearing as if hammered on the surface. Bunches very compact, not quite equal to the first in flavor; first-rate, ripe first week in September.

CHASSELAS FONTAINBLEAU (Syn. *Chasselas Precoce—White Chasselas—Royal Chasselas—Royal Muscadine*). Berries round, medium size, white, very sweet and vinous. Bunches tapering, well shouldered, medium size; first-rate, ripe middle of August.

CHASSELAS ROSE (Syn. *Red Chasselas—Red Muscadine*). Berries round, medium size, rose color, sweet. Bunches somewhat closer and smaller than the last; good, ripe second week in August.

MALVASIA (Syn. *Grove end Sweet Water—Early White Malvoise*). Berries oval, rather below medium size, greenish white, transparent, very sweet. Bunches small and clustered; first-rate as an early sort, ripe first week in August.

MUSCAT BLANC HATIF. Berries round, flattened on the end, amber white, large, musky, rich and very sweet; apt to crack if not well ventilated. Bunches medium size, tapering; first-rate, ripe first week in August.

PURPLE DAMASK. Berries very large, oblong, purplish black; flesh solid and sweet; skin thick. Bunches large and long; ripe last of September; useful as a late grape, hangs well.

WEST'S ST. PETER'S (Syn. *Black Lombardy—Poonah*). Berries medium size, oval, very black, covered with blue bloom, very sweet and sprightly. Bunches medium size, long, tapering, and well shouldered; hangs long, a fine late sort; ripe first week in October.

ZINFINDAL. Berries slightly oval, medium size, black, sweet, but rather tame. Bunches long, medium size; a good hardy sort, ripe middle of August.

GRIZZLY FRONTIGNAN (Syn. *Red Constantia—Grizzly Fron-*

tignac—Muscat Gris). Berries medium size, slightly oval, grizzly red, musky, rich and sweet. Bunches tapering, clustered, medium size; first-rate, ripe middle of August.

WHITE FRONTIGNAN (Syn. *White Constantia—White Frontignac—Muscat Blanc*). Berries medium size, round, light amber, musky and sweet. Bunches below medium size, long, small shouldered, a fine early sort, and hangs long; ripe middle of August.

BLACK FRONTIGNAN (Syn. *Black Constantia—Black Frontignac—Muscat noir de Frontignac*). Berries below medium size, round, black, musky and sweet. Bunches below medium size, tapering, small shouldered; ripe middle of August; subject to shank, second rate.

DECON'S SUPERB. Berries very large, oval, amber colored, appearing as if frosted over; very handsome, flavor sweet, but second quality. Bunches long medium size, shoulders small; ripe last week in August, a fine sort.

REINE DE NICE. Berries very large, oval, irregular, on the surface, rose color; flesh hard and sweet. Bunches very large, tapering, well shouldered and handsome; ripe beginning of October; hangs long, useful as a fancy sort.

WHITE NICE. Berries large, oval, white; skin thick; flavor second rate. Bunches very large, long, and heavy shouldered; ripe early in October; hangs very long, and keeps well, on which account it is desirable.

SYRIAN. Berries large, slightly oval, white, sweet. Bunches very large, broad, and heavy shouldered; ripe last week in September; hangs long, a fine sort.

XERES. Berries medium size, round, amber colored, transparent, sweet, but wanting in sprightliness. Bunches very handsome, large, long, and tapering, having many shoulders; ripe last week in August, a fine sort; subject to irregular sized berries, on which account, artificial impregnation is useful.

GROMIER DU CANTAL. Berries large, round, amber colored, blotched with purplish brown, sweet and brisk flavored; very thin skinned. Bunches large, broad, heavy shouldered; ripe middle of August; a good sort for immediate use, soon spoils.

BLACK PRINCE (Syn. *Cambridge Botanic Garden*). Berries a little above medium size, oval, black, very sweet and sprightly. Bunches tapering, well shouldered and long; ripe first week in September, first-rate.

DE LA PALESTINE. Berries below medium size, oval, amber colored, very sweet. Bunches much branched, and very long, often two feet; shoulders very numerous and long; ripe last week in September; hangs well, a fancy sort.

DUTCH SWEETWATER (Syn. *Pearl Drop—Pareyl Druyf*). Berries large, round, transparent, white; thin skin, very sweet and vinous. Bunches medium size, compact, and well shouldered, in form like Hamburgh; ripe last week in July, a first-rate sort; this is seldom seen true, an inferior kind (the old Sweetwater) being often substituted.

SCHARGE'S HENLING. Berries small, oval, very black, sweet and brisk. Bunches long, tapering, and clustered; pretty in form, a fancy kind only.

MUSCAT OF ALEXANDRIA. Berries very large, ovoid, am-

ber colored, musky, vinous and sweet. Bunches handsome, well formed and large; ripe beginning of September; hangs long, often a bad settler in a cold house even with care, first-rate.

The periods of ripening are arranged for the locality of New-York, south of which they will be somewhat earlier, and north a trifle later.

As many have only a limited space, or will only wish to cultivate the very best, the above list is reduced to twelve, and six, as follows:

The best twelve are Victoria, and Old Black Hamburgh, Chasselas Fontainbleau, Malvasia, Muscat Blanc Hatif, West's St. Peter's, Grizzly, and White Frontignan, Black Prince, Muscat of Alexandria, Dutch Sweetwater, and Zinfindal.

The best six are Black Hamburgh, Chasselas Fontainbleau, Malvasia, Grizzly Frontignan, Black Prince, Muscat of Alexandria.

Where profit and quality are the only objects, Black Hamburgh and Chasselas Fontainbleau will take precedence. If fire heat were used, I would add, Muscat of Alexandria, or Cannon Hall Muscat, but in a cold house, the two last are often bad settlers:—whatever care may be taken in impregnating, there is in some seasons a deficiency of heat at blooming time, and although success is sometimes obtained, they are

not always to be depended upon as a sure crop.

The Muscat of Alexandria and all its varieties are a class of grapes which require more heat, and a drier atmosphere than is necessary for any other sorts; they flourish best in countries which are often too dry and hot for the successful cultivation of other kinds. In Southern Spain, and the warm and dry climates of Lima, and similar localities, on the western coast of South America, they luxuriate without much care or attention, and produce most abundant crops of the finest fruit. Under cultivation, a dry atmosphere during the period of rest, and likewise at the time of the blossoms setting for fruit, is almost indispensably requisite; without this, the embryo flowers do not receive sufficient concentration, and consequently have not power enough to impregnate healthily. By artificially fertilizing with other varieties, and sometimes even by their own pollen, this enfeebled condition is much assisted. Where the musky flavored grapes are preferred, this want may be made up by planting an extra quantity of Frontignans and Muscat Blanc Hatif, which is of the same class, and one of the finest flavor, quite equal to the Alexandrian Muscat. All of these

have the advantage of being early varieties, and the good property of hanging long after being ripe. The Muscat Blanc Hatif is faulty from its liability to crack when swelling off for ripening, but a free ventilation at the time, and a drier atmosphere will considerably counteract this evil, and when once ripe, it will continue good for a long time.

The most proper time for planting is about the beginning of March, when the vines have not been prematurely started into growth, as they are then just commencing to move from a long repose, and have no great time to remain in their new quarters before fresh rootlets begin to push forth. When deferred much longer, these fibres are subject to injury, being very brittle. If the vines have been grown in pots, which is generally the case, the soil ought to be entirely shaken from them, and the twisted up roots carefully straightened out, care being used when planted, that they are spread in all directions, diverging from the stem. After loosening up well, and smoothing over the surface around on the base where it is intended to fix them, have in readiness a quantity of the same material as the border is composed of, mixed up with a third portion of leaf mould if to be had—if not,

it is not of much importance, but the young rootlets soon lay hold of it, and a good start is half the battle. Strew about two inches of this compost over the surface, and place the plant thus spread out upon it; next cover with about three inches of the same mould. The crown of the root will be thus elevated a little above the surrounding surface, which will prove advantageous afterwards, as a top dressing can be added without it being sunk down below the general level. Avoid deep planting in all cases, for it leads to cankered roots, and places them out of the reach of the warming influence of the sun, and the exhilarating action of the air; both of which are as beneficial to the roots, as is light and heat to the leaves. Before planting, cut off the top of the plant to about six to nine inches, or down to two or three good eyes. The advantage of leaving more than one bud, is the choice it gives of retaining the most promising when started, when all the worst can be rubbed off.

It is sometimes inconvenient to plant at the time above recommended, from some local cause; in which case, the plants may be removed into suitable pots, and put to grow in some other house than the one in which it is intended to plant permanently, when they ought to be treated

with heat, moisture, &c., as if in their final resting place, and as they progress in growth carefully tied up, and the roots not allowed to become cramped for want of pot room. By attending to these points, they may be kept on till June or July; after which, if carefully turned out of the pots without disturbing the roots any more than can be avoided, a good cane may be obtained the same season, though not often strong enough to bear fruit the following summer; but which, if planted in March, can generally be accomplished. After planting, give a good soaking of water to settle the soil around the roots, but do not allow it to become saturated afterwards by too often repeated applications. The object is to keep it just moist but not sodden, as the tender roots are soon rotted when not drawing freely.

If the vines have been prematurely started into growth (which is not desirable), or it is thought fit to plant those that have been raised from the eye the same spring, the planting ought to be deferred till the middle of April, or beginning of May, even though the house may be ready in due time. If planted sooner, they would, under such circumstances, receive a sudden check, from being turned into a much colder

atmosphere than the one they had previously occupied, and which would militate very much against their future prosperity, if not be the cause of utter failure afterwards.

CHAPTER V.

Management the First Year—Low Temperature, and gradual increase of—Damp Atmosphere—Evil of Bottom or Front Air—Early closing—How to train the Vines—Extension of Roots—Forking and Mulching—Heat enough not generally given—Gradual Reduction of Moisture, and Increase of Air—Pruning and Disbudding—Preparation to wash over the Vines—Covering and Top Dressing.

WE will now suppose that the house is planted, and all ready for a favorable start.

For the first two or three weeks keep all as close and cool as possible, only giving sufficient air to lower the temperature. If the buds are started too early there is danger of late spring frosts and cold storms, by which they are liable to be injured. After this time the house may be kept a little warmer, and the vines syringed overhead two or three times a day. Do not yet apply much water to the roots, only maintaining moisture enough to keep the soil damp without becoming soaked, as they have not got into brisk action, and cannot draw much of it up. Avoid dry winds, and retain a moist atmosphere, allow-

ing the thermometer to rise from 70°, to 75° in the middle of the day. By the middle of April the buds will be mostly well started; rub off all but the strongest one, and mind that it is not injured or the top broken out. As the vines continue to push, the paths and whole interior surface of the house, and likewise the plants should be damped with the syringe or hose morning and evening, and during dry weather in the middle of the day. Do not give any bottom air at any time until the fruit shows for color, for it causes cold drafts in the lower part of the house and checks growth, rendering the vines subject to mildew. Shut up the house early to retain a genial warmth before sun-set, and gradually increase the temperature, so that at the beginning of May the thermometer may stand at 90° at mid-day; in cloudy weather keep the house closed, and endeavor to maintain as steady a heat as possible. By the middle or latter end of the month the vines ought to be growing vigorously; tie the canes up carefully as they progress, leaving space sufficient for swelling, and as the laterals push, pinch them off to one joint, reserving one or two at the top at each pinching in case of accident to the leader, and likewise take clean out the lower laterals (or

those last left with one leaf), at each future operation. By this mode of proceeding they are gradually reduced and finally taken away, without endangering the bursting of the buds on the base of each leaf, which are wanted for next year. The heat may now be increased to 95°, still recollecting to ply the syringe freely, excepting in dull or cold nights, when water ought to be withheld; as under such circumstances it is apt to starve and check the circulation—a matter of great importance.

The roots will now begin to push according to the expansion of head, and must have some attention; for here are the mouths, and here is the stomach, and woe betide the other members of the body if they are not well supplied. Equally in proportion to the amount of healthy foliage, will they draw moisture from the base in which they are located, so long as free development is progressing; and water ought to be applied to the soil accordingly. As there may be reason in all things so in this, and the borders ought not to be saturated by too often repeating the application; but of this there is not much danger if the under base is well drained. A forking, both inside and outside, over the whole surface will now be of service; but do not injure or

disturb the roots. This will loosen up and render the bed more porous, and the small rootlets will feel their way more freely; after which a mulching of dung or short grass, four or five inches thick, will prevent evaporation, keep an equable temperature and moisture in the soil, and during hot and dry weather will render almost needless, that greatest of evil necessities, artificial watering to the outside borders. Gradually increase the heat as the vines progress more freely: by the begining of June it may be allowed to rise from 95° to 100° at mid-day. If the air is kept damp, scorching from so great a heat will be prevented; and both combined will enable the plants to develope their fullest energies.

Many persons do not give heat enough; even some of our very best grape growers are too sparing in this respect. We ought to consider that, as the grape-vine is generally grown under glass, we place it in a position, by the supply of rich food, to produce a more than natural distention of cellular tissue. The larger leaves also are capable of doing more work in elaborating the juices drawn up from the roots; and these large leaves being filled with an uncommon amount of sap, require a corresponding assistance in the form of heat and light, to properly chemi-

calize (excuse the expression) this extra quantity of crude fluid. Hence the necessity of a warmer temperature than would suffice for the same plants, were they growing in the open air, and the roots in a soil only ordinarily fertile.

When the canes have grown to the top of the roof, do not stop them, but train the tops between the vines on the opposite roof if a double pitch, and if single pitch, they may be allowed to hang down from the top; stopping the leader when it has advanced somewhat downwards, and leave the laterals on the same length. Thus the plants will go on swelling their growth without check, and adding bulk to their structure.

Towards the middle of August the air may be allowed to become somewhat drier, and syringing overhead gradually lessened, as the wood will begin to mature; the lower ventilators may also be opened on clear days—a little at first, increasing more from day to day. By the third week in September, water should be withheld altogether; and as the wood will be ripening up, air ought to be freely admitted through the day, and the temperature decreased as the canes approach maturity. When the bark becomes brown and the wood solid, the house may be thrown open day and night, excepting

in case of frost or heavy rain, as the object is to let all go quietly to rest, and the leaves to fall off yellow and fully ripe, when we may rest assured, that nature has done her work according to her own will, and we have assisted her in accordance with her own laws.

As soon as the leaves are fallen, proceed to pruning. If all has gone on as it ought to, the canes will average five-eighths to nearly one inch in diameter, according to the natural vigor of each individual variety; and a corresponding length, when not stopped, of twenty-five to thirty-five feet. Cut off the strongest to about seven, and the weakest to about five feet. Afterwards take out with the point of the knife each alternate bud, which will leave the remainder about fifteen or eighteen inches apart (the object of which is explained in the chapter on pruning). Commence at the top, leave three buds: one for next year's leader, and the others for side spurs; proceed downwards, leaving each alternate pair (one on each side) to the wall plate, as beneath this the leaves and fruit would be out of the sun's influence, and only subject to encourage mildew; all buds below ought to be removed.

The vines may now be washed carefully over with the following preparation, which will de-

stroy the larvæ or eggs of insects, if any should be existing: whale oil soap one-fourth pound, sulphur four pounds, tobacco one-fourth pound, and nux vomica one ounce; pour over it boiling water two gallons, and stir all well till thoroughly mixed; as the nux vomica is a deadly poison to animals, care should be taken that it is not left carelessly about. After being thus washed over, the canes can be slung loosely to the wires till the weather begins to be severe, when they should have a coating of straw three or four inches thick tied around them, and the heads brought down one over the other in a horizontal position, about two feet above the ground level, in rows along the line of planting; this will leave the lower part of the stem nearly upright, and prevent the crown of the roots from being strained or disturbed. At the same time, have in readiness a quantity of prepared turf sods or fresh earth, which has been mixed up two or three months with a third part of good stable or barn-yard manure, fork over the borders both outside and inside of the house, and add a dressing three or four inches thick of the above compost. If the crowns are planted slightly elevated as recommended, this dressing will make the surface level and greatly assist the making

of young rootlets next spring, besides protecting the tender fibres through the winter. Over this put a good coating of littery dung, or other material to keep out the frost, and which may remain on next summer as a mulching.

Nothing further is now required, but to shut up the house on severe nights and wet weather, till the buds show signs of bursting in the following spring.

CHAPTER VI.

Management the Second Year—Retarding the Buds—Uncovering, &c.—Application of Water—Reducing Bunches, and stopping Side-shoots—Blossoming, how to manage—Ventilation—Further Reduction of Bunches, and Weight of Fruit to be left—Encouraging Lateral Action—Thinning of Berries—Increase of Temperature—Stopping Leader—Watering and Mulching Outside Borders—Ripening of Fruit and Wood—Pruning and Covering—Winter Management—Weight of Fruit in after years.

As the winter milds off and warm sunny days commence, give air sufficient to keep the house cool, and to prevent the buds from pushing as long as possible. If too soon excited, the young shoots are in danger of being injured by the late spring frosts and cold storms. When it is perceived that the buds are swelling and can no longer be kept back, take the covering off carefully, and tie the vines down in the form of an arch, with the heads leaning from the glass; as in this position they are not so subject to injury in case frost should occur. Give a good and thorough soaking of water to the inside borders, which by

this time will have become very dry; also syringe over head two or three times a day, excepting when the weather is cold, or frost is to be expected; they will be assisted thereby to break uniformly and strong. The temperature may now be kept as recommended for the same period last year.

When the young shoots begin to elongate, sling the canes loosely to the wires, but some distance from the glass; as the further off for a short time to come, the safer they will be from frosty nights. When danger is past, tie them finally in their places; leaving the strings loose enough for future swelling, and be careful in training the leading shoot upwards, as at this time it is very brittle and easily broken. If not quite straight with the old cane, the better way is to bring it into the right position, a little at a time.

The bunches will now be clearly discernible, and when they have fairly unfolded from the buds so as to show their form and comparative strength, take out all excepting the strongest and handsomest one upon each shoot; and remove likewise the tops of the side branches, beyond the third or fourth leaf above the bunch. These will again break from the top eye, and as they do so from time to time; nip out the leader to

one leaf above where it was last topped. This keeps the branches within bounds, and at the same time, leaves sufficient leaves to mature the fruit, and perfect growth.

As soon as the blossoms begin to expand, withhold water overhead; let the atmosphere become somewhat drier, and keep up a little more heat: from 85° to 90° at mid-day is not too much: close with good warmth in the afternoon, and open soon enough in the morning, to prevent a scalding smell in the house. At all times, with a clear sun in the morning, ventilate as soon as the house begins to warm a little; and close early; the temperature by these means rises and falls gradually. Nothing is worse in all plant culture than allowing a house to be closed till it becomes hot; and admitting at once a great quantity of cold air. In grape growing, it leads to the most baneful results. Open soon, and close early, ought to be a maxim, well riveted on the mind. Always have a thermometer hanging midway in the house, about four feet from the ground, and shaded from the sun; observe it closely, and be guided by it, and experience in ventilating will soon be acquired, better than can be described by words;—always remembering that a gradual rise and fall are the desiderata. Attention for

a little while will teach, that early closing tends greatly to regulate the heat in the after part of the day; and a due observance will lead to exact adaptability.

As the flowers continue to expand, go over the house once a day, and shake the bunches by a slight flirt of the finger; which assists in distributing the pollen, and enables impregnation to go on with more certainty. This operation is best performed in the morning, about the time of giving air; as the flowers of all plants are then in greater activity, and consequently the operation produces more perfect fertilization. There are certain kinds, as the Alexandrian Muscat, and its allies:—Purple Damask, &c., which do not readily fertilize with their own pollen in a cold house, that may be much assisted, by shaking over the flowers a bunch of Hamburgh, or other hardy sort; and as there are more bunches than are required for ripening, there is always enough to spare for this purpose.

When blossoming is over, and the berries are fairly set; a good syringing overhead, will clean all the decayed portions of flowers, which cling to and amongst the berries; and will invigorate the whole plant. Let water now be freely given over head; being careful that

at no time it is driven with force against the fruit; as in such case it will mark them, and produce rust.

It will now be plainly seen which are the best set and handsomest bunches; and as there are more than it is advisable to ripen off, on account of the youth of the vines, and the danger of overbearing, thereby injuring their permanent prosperity; it will be advisable to reduce the number according to strength of plant, or weight of bunch. A cane of three-fourths inch diameter, may be allowed to carry from six to seven, and one of half an inch, five to six pounds; but where they are smaller than this, only one; or at most two bunches ought to remain. Some kinds form much larger bunches than others, which may be ascertained in some measure while young, and the number may be calculated accordingly.—A well shouldered Hamburgh will weigh from one and a half to two pounds; if very large, from three to three and a half: while the Malvasia, is a large bunch of its kind at ten ounces. Better to be guided by comparative weight, than number of bunches, as greater equality is gained, and the vines rendered more uniform in vigor afterwards. Be it remembered, that it is much more difficult, to bring back energy

where a part is injured, than where the whole is so; for the well doing, will take the lion's share of nutriment from the borders. In removing the superfluous clusters, take out the worst formed and weakly, and let the greater part be near the top of the plant; leaving the bottom spurs as free as possible: for a vine while young is prone to push its strongest growth upwards. By bearing the upper part the heaviest, the circulation is equipoised, and the lower laterals are relieved. If the flow is coaxed to take a lateral course at first, it is much easier to retain the same afterwards.—There is no occasion to crowd all the crop at the top; only let the greater weight be there, and the object is accomplished.

All is now to be considered in full action;—the grapes about the size of peas, and swelling fast; when it becomes necessary to commence thinning out the superfluous berries. First, tie out the side branches in a horizontal position to the side wires, if not already done; then fasten a string to the end of each shoulder, and sling it up, at right angles with the stalk, to the wires also; the smaller clusters may be opened out by inserting small strips of wood, notched on the ends, under them; and supported upon the projecting stalks below. This will open out the

bunch, and prevent the weight of each cluster from bearing upon the lower berries. Next, proceed to cut out a part of the berries, commencing at the bottom; leaving those for ripening far enough apart, to allow the aggregate to swell up, without squeezing each other individually when fully grown. Some care is required in this operation, and also a little idea; for the object is to leave each berry sufficiently asunder to allow for full development, and yet not so far wide as to make the bunch lax and straggling. No exact rule can be given as to distance required, but generally, one-half to two-thirds ought to be cut away: the larger berried kinds will require more thinning than the smaller, and a reference to the descriptive list above given will be a guide. The latest sorts too, and those intended to hang longest, should be more distant than the earliest; for, when a little asunder from each other, the grapes keep good much longer than when crowded. An experienced hand, can tell pretty accurately how to thin, so as to make once going over nearly suffice; but for beginners, it is perhaps better, to perform the operation at two or three times, as they swell up. After the first year's practice, the right idea is gained, and there is afterwards no difficulty. When thin-

ning, do not handle the berries, or let the hair rub them; for while young, the skins are very soon injured,—they afterwards become disfigured, and marked with what is technically called rust.

Continue to keep up a temperature of 90° to 100° through the day, and use water freely; damp the house two or three times between morning and evening. When syringing in the evening, force the water into all crevices and corners of the wood-work, to dislodge insects. Where this is attended to, red spider or other such pest will never do any harm. Do not wait till these rascals make their appearance, but always act on the principle, "prevention is better than cure."

As the leading shoot continues to progress, train it over the top to the opposite side, as advised for last year, and when it interferes with the fruit spurs in its downward course, pinch out the top, as it would deprive their leaves from receiving due light.

In very dry weather, it will be necessary to use water on the outside borders; generally one or two applications is enough for the season, but if very severe drought should continue, it will be advisable to repeat the operation every two weeks, till the fruit begins to color; after which

there is no occasion for more, as there will be plenty of moisture in the ground outside for all purposes. When it is done, let it be a thorough soaking; no mere dribbling, but sufficient to penetrate down through the borders. The mulching which was applied previous to winter, should also be examined, and if the surface is not well covered, add more. If the liquid drainings of a dunghill can be had, so much the better; but first dilute with an equal portion of soft or rain water, and never use it but in a clear state; as otherwise, it clogs up the porosity of the soil, and renders it sodden and "sour." The drainings from a cowhouse are also very good, but ought not to be applied till somewhat fermented; as while caustic, the salts contained in it are very destructive to the roots. Many persons, apply liquid manures of various kinds without caution, and often do much injury; while if rightly used, they are of the greatest advantage. By the second week in July, some of the earliest sorts will begin to change for ripening; when water may be dispensed with overhead, but still applied to the roots in clear weather, which will cause the atmosphere to be drier. With the ripening of the fruit, comes also the ripening of the wood, and during this period, water

is only essential to keep up a healthy action, and should gradually be discontinued. As a little quantity often distributed, only damps the surface, and the evaporation resulting, produces a moist atmosphere,—when a dry one is wanted; the times of applying it should be less often, but when done, a good soaking should be given. Once a week for two or three weeks will be enough, and after that time, once in two weeks up to the middle of September, when it may be withheld entirely.

As the grapes continue to color, admit more air in clear days; open the lower ventilators a little at first, gradually increasing, till a free current of fresh air is obtained; which will assist coloring, and ripen the wood.

After all are ripe, the house may be thrown open both day and night, excepting in storms or wet weather; when it ought to be partially closed, so as to keep out the rain; and at the same time leave air, to prevent the grapes from becoming mouldy or cracked.

When frosty nights begin to occur, the house ought to be closed in the evening, and opened again early in the morning. Let the temperature gradually cool down, but keep the leaves from injury; the grand object now is to preserve

them, till they fall off perfectly ripe; as then we know that nature is satisfied, and the wood ripened good enough to insure all requirements for another season's development.

Immediately after the leaves are fallen is the best time to prune. Cut off the cane of the present year's growth to the same length, according to strength, and likewise disbud it, as advised for last season's pruning, which will make a total length from the bottom of nine to twelve feet. Cut the side spurs to three or four buds from the extreme base, according as they may be plump or well rounded: at the same time peel off the loose bark from the outside of the stem which has had two seasons' growth, but do not injure the bark immediately beneath the loose outer covering, nor remove any from the side spurs or present summer's cane. The object of this peeling is to prevent the lodgment of insects beneath; with this exception, it would be better left on, for nature never forms any covering but what is useful. As this outer and loose bark is virtually dead, it is of no further use than protection against cold, so that if the vines are carefully covered from extreme frost, there is no harm in taking it off.

The vines may now be washed over with the

preparation as was advised last year, and brought down in the same horizontal position.

As it is not easy to cover the spurs if wrapped round with straw, the better way is to have long narrow boxes, open at the ends, and invert them over the rows, or to cover loosely with salt hay or straw. Let the house remain open through the winter, excepting in stormy, wet, or very severe frosty weather; and shut up the doors at night, to prevent rats, etc., getting in, as they will gnaw the bark: a good way is to keep a cat inside.

A week or two previous to the leaves falling, fork over the borders carefully, both outside and inside; by doing it at this time, any small rootlets which may be unavoidably broken, will have time to heal up before winter sets in. When severe weather is apprehended, cover over the whole surface with three or four inches of good stable manure, and if there is any dry litter or leaves at hand, add a layer over the top, which will prevent the frost from entering, and make "assurance doubly sure."

As the general routine for last season's practice will apply to all others, it is useless to follow this part of the subject further, than by stating, that the average crop may be doubled according

to strength of vine, which will admit of ten to fourteen pounds of grapes being taken off each, providing all are healthy. It is well to observe the progress of any which do not keep pace with the rest, and where there is a want of vigor or robust health, ease accordingly, by not allowing them to carry an average crop along with the stronger ones. A much larger weight might be allowed to remain under some circumstances, but I doubt whether, as a general rule, it would be advisable where permanent prosperity is desired. What is mentioned is easily attainable, and nothing is advised, that I have not practically found to succeed as described.

In pruning in the fall of the third season the process is somewhat different from that of last year, and which difference is fully detailed in the next Chapter,

CHAPTER VII.

Pruning and Training—General remarks—Double Spur—Close cut Spur—Long rod—Long rod modified—Renewal and Extension methods—Remarks on the advantages of the Extension of the Branches.

THERE are various methods of pruning and training the grape-vine, and each method has had its supporters. Good crops also have been produced by many of them under skilful hands, and no doubt will continue to be. The fact is, the grape-vine is so productive and fruits so freely, even with very ordinary treatment, that bad indeed must be the case when it ceases to yield its luscious sweets. Yet while so submissive under ill usage, and grateful as it were for a common existence,—like other creatures of nature's higher organization, its expansive powers will become contracted, and the tractable disposition rendered stubborn, by long-continued abuse. In which case, the quality of the fruit is deteriorated, the bunches are small, or the flavor infe-

rior. As pruning has something to do with this; particularly the small bunches, it may be well to explain the different modes that are practised, and state the various results obtained by them.

Although it is best to allow the grape-vine (like all other fruits) to judiciously and periodically extend the superficial surface of the leaves and branches, our arrangements and conveniences do not always admit of this most desirable consummation being carried out. Such being the case, it behoves us under the circumstances, not to distort nature any more than we can avoid. In accordance with these views, is mentioned first the plan which I generally adopt.—It is likewise more in place here, being a continuation of the practice so far detailed in the preceding pages.

It is recommended in pruning last fall, to cut the side spurs back to three eyes, or to a good, plump, and well-rounded bud. Now when these buds begin to grow, we ought to have a shoot from each of them; and as only one bunch ought to be allowed to remain on each base, the other shoots will appear so far superfluous. Retain the one at the base or nearest to the main cane, and likewise, that one above it which shows the best bunch; rub off the others, and pinch out the

fruit from the lower, and also all, excepting the best formed bunch on the upper one. As they progress in growth, take out the top of that which has fruit on, three or four leaves above the bunch, and let the other extend until it has unfolded seven or eight leaves; then stop it. Bring the bearing branches down nearly horizontal to the upright cane, and tie them to the side wires; train the others at an oblique angle, and tie them likewise. They will now appear as seen in fig. 6—*a* is the base shoot, and *b* the fruiting one. As both continue to push forth fresh growth from time to time through the summer, nip out to one leaf above where last topped. After the fruit is cut, and the wood becomes ripe, say two or three weeks before the leaves fall, go over and cut (*b*) clean away to the base of (*a*), which leaves the spurs for fruiting next year as near to the main cane as if the close cut method had been adopted; with the advantage of having spurs which have not been burdened with fruit, and also finer bunches; as the most prominent and well formed buds always bring the best shaped and largest clusters. There is no fear of not getting shoots from the base if

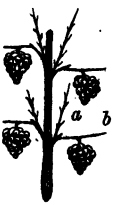


Fig. 6.

properly managed; for in most cases adventitious buds, and more than will be wanted, are developed, and have to be rubbed out. When these side spurs have advanced to the top of the house, the leader may be cut off above the top pair, and if proper care has been taken in breaking them as previously advised, there will be a uniform strength over the whole vine. If the canes have been previously disbudded, there is no danger of overcrowding; as the following year the bearing branch is brought down to the same position as that of last season, and the other one trained more upright into the vacant space.

All trees have a natural tendency to push the strongest growth to the top, and extreme ends, particularly while young. If the side branches are very closely cut away periodically, the sap is directed more strongly upwards, the lateral force is reduced in a corresponding ratio, and the side branches rendered weaker. This is often seen to be the case with the grape-vine, and is as often a cause of complaint. Now the above method very much counteracts this evil; as a greater quantity of leaves are encouraged from each individual base, and, of course a greater draw of the sap is produced into the side branches, which

when once established remains permanent; so long as the same causes are in existence, the flow is equalized; the side spurs correspondingly stronger; the buds more plump, and the bunches larger. To still further encourage this lateral action, it is not advisable to take out the overplus buds in the fall, at the same time that the top cane is disbudded. All plants are collecting food and filling up the buds through the winter, excepting when the whole structure is frozen; consequently, all the buds receive a due share; and although a portion of this food is wasted, by taking out the otherwise useless buds; we have gained the advantage of encouraging a greater flow into the side branches until the time, when the expanding leaves are enabled to keep up the action.

Another method of spur pruning, and the one very generally practised, is to allow the cane to extend itself each season upwards, as above described, until it reaches the top; and retain the side spurs closer and alternately arranged along the cane, each season, resting, or not allowing to bear, each alternate spur; and when pruning, cutting each spur close into an eye; or leaving those for bearing next year somewhat longer, and in the fall following, cutting the same spur

close into the cane; the object being to keep the side branches at home. Fig. 7 shows the cane when pruned. Very good crops are often produced by this mode, with otherwise good treatment; but in the first instance, the bunches are generally small, and although in the latter this is for a few years obviated; still there is the disadvantage of having to cut back to the main stem, and of trusting entirely to the buds which may thus be prompted to push forth. This close cutting weakens down the lateral force of the plant's energy; in a short time the spurs become weak; the whole cane has to be cut down, and a new one taken up; by which one year's crop is lost. I am aware, that in thus speaking of this walking-stick mode of pruning, I am going in the face of many good grape growers; but the fact of a thing being generally "fashionable" is no criterion of its excellence. Nature's action in all these affairs ought to be our guide, and the more we adapt ourselves to her laws, the more certain will be our permanent success.



Fig. 7.

Sometimes the long rod method is practised. In this case, the first summer, the cane is trained up as in the former modes, only left somewhat

longer at pruning; and this suffered to bear a full crop the next season, when it is cut clean out to one eye, from the bottom; another cane being taken up from its base at the same time, to again take the place of the one last fruited (fig. 8), and so on. By this plan fine fruit may be obtained, as the bunches emanate from strong eyes, which if previously well ripened, throw off handsome and large clusters; but there is the disadvantage of having to cut off at one fell swoop the half of the plant, leaving no perennial structural base, excepting the very lower stump of the plant. This wholesale and oft-repeated cutting, keeps the plant in a constant excitement; which will eventually show itself in premature weakness. It is sometimes useful to resort to this way where the upright training surface is contracted, as in narrow or short-raftered pits; but even here it may be modified, by extending and training the leading shoots horizontally a little further each season, and taking upright canes, at the distance of two feet apart from these main branches; each alternate upright to be cut out to an eye after bear-



Fig. 8.

ing; and during the same time taking a cane up in the other alternate spaces, as seen in fig. 9.

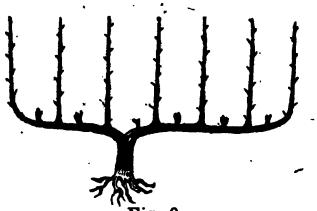


Fig. 9.

As these horizontal shoots elongate the vines which are right and left of them may be taken out.

The renewal method is adopted by some, which is as follows. The one year old cane is cut back to about half the length of the rafter, and is allowed to bear while fruiting the next summer; it is allowed to extend perpendicularly, and pruned at the top of the roof; during the same summer, another cane is taken up from the bottom, and on one side, which is cut back to one half, as the other one was last year. The next season, this new cane is allowed to bear, and also the upper part of the first one; the spurs on the lower half having been cut out. Thus there is a full crop, only each half is on two separate canes. The youngest one is now suffered to grow, and is in its turn cut off at the top; another brought up from the bottom, and the oldest cut clear out. Fig. 10 represents the three separate canes in their different stages. Here we have always the

fruit borne on young and vigorous wood, which generally produces the finest fruit; no spurring is required, and there is the advantage, of possessing a large bulk of branches and leaves, the latter of which affords nourishment and maturity to the roots; but the tops require somewhat more side room, and the vines ought to be planted a little further apart than is necessary where spurring is resorted to. Where a vine is only allotted a certain space, this is one of the best methods of training; but it is unsightly, and if the same advantages can be gained otherwise, and at the same time beauty in appearance, it is certainly desirable to insure both. Now the first described mode accomplishes this object, and also retains a larger amount of solid structure in the form of a strong permanent stem; through which can flow an ample supply of sap to the leaves, and receive back the food, elaborated by them down to the roots in a healthy way, and without any undue excitement to the whole organization.

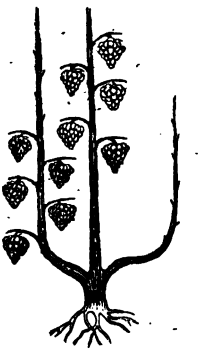


Fig. 10.

But the best of all plans, and also the most natural, is to extend the head somewhat each season; so that finally, one vine may cover a large surface. Nature works by certain fixed laws, which man cannot alter; and any long-continued attempt to force her to swerve from her own course, is sure to end in final failure and disappointment. It cannot be denied that much success is obtained by modes of cultivation, which would appear to speak to the contrary; but observe the ultimate results patiently, with care and without prejudice, and all these abuses will tell their own woful tale.

One of the causes why the grape-vine so soon wears out, as it is generally considered to do, is produced by such very close pruning as we yearly subject it to; the volume of the plant is increased for three or four years at first, and afterwards only allowed the same extent of surface.—There is no other fruit-bearing plant, that would continue to prosper long with this treatment. Take, for example, a peach or an apple; allow it to produce a long straight stem of twelve or fifteen feet, and cut in the side branches to an eye; never suffering it any further extension but what is produced in the summer,—again to be cut out; and it would, after a few years con-

tinued excitement, dwindle down to a mere scrub, and finally die out. If the grape-vine does not show the same so readily, it is only because of its extremely voluble constitutional powers. The same law governs both, and both alike must, sooner or later, arrive at the same imbecile and depauperated goal.

As a vine, if extended over a great space, would only admit of a limited number being grown, it becomes necessary to explain how this may be accomplished; and likewise how during the interval, the usual crop may be secured. In planting, place in the centre of the intended row a vine of known good qualities; at intervals of about twelve feet, plant others of equal merit, filling up the vacancies with sorts as fancy may dictate; so that each one may stand about three feet apart from the next. During the first two seasons, train all up as is usual.—So far we have elongated the surface upwards, and the canes will be near the the top of the house. In prunin the second fall, there are side spurs on the lower half of the canes; prune these in to about three eyes. Bear each other vine as heavy as it is thought advisable, so as to secure the fruit ripening and coloring well; ease the others in like proportion, which will give vigor and

assist them afterwards. When the fruit is cut on those vines which have carried the heaviest crop, take them out, and when pruning the others, leave the side branches about a foot long, which will fill up the vacant spaces. Next year train these side branches horizontally, and in the fall following, spur them as advised above with the upright cane, and at the same time leave another length at the end. As these side branches continue to be lengthened and fill up more space; bear those vines, right and left of them, somewhat heavier, and take them up. In the course of a few years each vine will appear as seen in fig. 11.

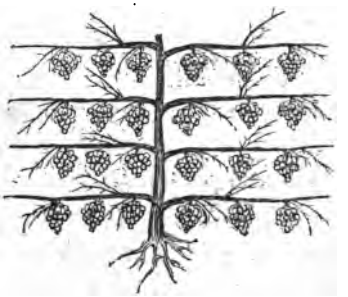


Fig. 11.

By this system, it will readily be seen, that few varieties can be grown in a limited space; but quality is always the more satisfactory per-

manently; and where variety is required, it may be had in the first instance, and quality secured afterwards, if care is taken in planting good sorts in the right places.

It may be thought by some, that so few vines are not able to carry a full crop in a given space,—never fear that, for if there is sufficient surface of well ripened wood, the roots in good order, and the expansion judiciously accumulated, the crop may be gradually increased, until a ton weight may be taken off a single vine, and that without injury, as is proved by some now in existence which are known to be over two hundred years old, amongst which may be mentioned the large Hamburgh, at Hampton Court, near London, which has frequently borne the above weight in a season. Show me an instance where the same longevity and continued fruitfulness has been gained by the ordinary walking stick, confining to one cane method, and then I will believe that nature can alter her course.

That judicious shortening in at the right season, and under proper circumstances, is beneficial, has been clearly demonstrated. We know that it tends to give vigorous and healthy growth —both theory and practice tell us so. By it we gain a stronger propelling power from the roots

without reducing their volume or enfeebling their energy. *But to annually cut so free-growing a plant to a mere stump, is to say the least of it, a barbarous mutilation of God's providence, and is sure to end in premature weakness, sappy, papery leaves, spindly, ill-ripened wood, and barrenness.* By this method the roots have also an ample space to luxuriate in: one vine would eventually occupy and fill a whole border, which usually has to accommodate twenty. As a matter of profit, it is the most beneficial, as there is surely more lasting gain where a house will continue to yield a good crop for two or three generations, than where the planting, making fresh borders, &c., has to be renewed every ten, or at most, twenty years. I do not wish to be severe in these remarks, for there are many so situated by peculiar circumstances as to prevent their carrying out the more natural modes. At the same time there are others who have popular and practical prejudices to overcome, before they will be enabled to see the desirableness of asking themselves a few physiological questions, and taking the trouble of finding the answers in nature's voluminous folios.

May we hope that these set notions and dogmas may speedily vanish, from this free

country at least, *where the psychological and physical industry of man are unfettered, and where we may become a pattern to the world in good culture,* if not in artificial grandeur.

CHAPTER VIII.

Mildew—Failures from Excessive Changes—Different Kinds described, and their Action—How the Sporules may traverse the Internal Structure—Circumstances under which they luxuriate—How to reverse—Remedy—Sulphur, and how to apply—Time of Appearance—Different Sorts not injurious to Growth.

NEARLY all attempts to cultivate the exotic grape-vine in the open air, in the United States, have ended in total failure and disappointment. In a few solitary instances, and under peculiar circumstances, where the excessive changes have been counteracted by shelter or otherwise, a partial success has been obtained; but the climate of the whole eastern and middle parts of the Union is too variable for its easily checked, though vigorous constitution, and by which the vital energy is impaired at the time of greatest activity—when mildew in various forms completes the work of destruction. This mildew is the growth of fungoid vegetation, the seeds of which are so small in many kinds as to be in-

visible to the naked eye. There are two kinds which are most troublesome to the grape-vine: one, which I suppose to be the *Oidium Tuckeri*, that is at present devastating the vineyards of Europe; and the other a *Botrytis*, or some analogous genus. The first indication of the former is shown by the leaves having brown spots upon them. Afterwards are seen small white patches of the soft and delicate fungus attached to the leaf on the under side, which if not speedily stopped, afterwards extend to the fruit stalk, penetrating the berries with the rhizoma or spawn, making them hard, and in appearance like a diseased potatoe in the first stage of infection, stopping their further ripening, and rendering them useless: the leaves also fall off after a short time.—These white patches are the fructification of the parasite. When viewed under the microscope, there is exhibited a multidudinous congregation of little mushroom-looking substances, and if suddenly jerked, the tiny sporules may be seen detached and floating in the atmosphere, so minute and subtle, and in such countless numbers, that it is reasonable to suppose (besides the immediate development and rapid vegetation of thousands of them under favorable influences), many are absorbed by the

stomata or breathing pores, on the under surface of the leaves, and conveyed into the interior, simply by the descending current of the sap, which afterwards is converted into woody structure; and in its turn becomes the organized medium, by which the ascending sap in spring flows with greater velocity to the unfolding leaves.—These sporules can be then reconducted upwards, and conveyed onward to the leaves, and there remain dormant, until the favorable circumstances occur for their germination, when they spring into renewed life, and speedily produce another crop of seeds for a future generation.

The other kind of mildew appears like a fine delicate hoary mouldiness, and vegetates along the young wood and tender growth of the stem, the leaf stalks, and over the surface of the berries; enveloping and covering them so as to prevent further progress, making them useless. The stems, too, if it is not checked, will ultimately cease to grow, and the leaves remain inert or fall off.

The peculiar circumstances under which parasitical fungoids luxuriate, are wonderfully dependent on the state of the atmosphere. This is demonstrated not only by the different sorts

of grape mildew, but in all others,—not that all are alike susceptible in the exact proportions, although it is a pretty general rule; which shows that like causes produce like effects, only in a different ratio, as the constitution of various plants may be able to withstand the different intensity of the various atmospherical changes without a revulsion of the flow of sap, and thereby prevent those exact requirements, without which the fungus will not germinate. Although, afterwards it is not equally particular, perseverance with the same remedy will finally destroy and overcome the advancing pest.

It follows then, if the above observations are correct, that the main preventive of mildew is to keep the plant in steady and healthy action; not only by adapting a due proportion of food, moisture, and heat, according to constitutional requirements, but by preventing sudden changes in the atmosphere with which it is surrounded, and particularly cold drafts in the lower part of the house; for as heat accelerates the circulation, and according as the whole cubic bulk of air in the house is equally heated, so will the circulation be equal over every part of the plant, or vice versa. In my own practice, bottom air is never admitted until the crop begins to show

for coloring, and although the above remarks may be thought nothing more than abstract theory by many of practical experience, I am convinced by close observation of the utility of acting up to it. As regards common practice it amounts to this: during the time when the vines are growing freely, keep up a strong, steady heat, —avoid damp and cold draughts, and south and east winds during cloudy weather or storms,— keep the house closed in such case,—be careful that it is not suddenly heated up when the sun breaks out afterwards,—regulate the moisture according to the aridity or otherwise, of the outside atmosphere,—close in the evening soon enough,—and open in the morning soon enough. Use observation, and remember that to reverse the action of the various sudden changes is the grand desideratum, and the whole thing "lies in a nutshell." The best of us may be sometimes put on our mettle, but care and attention will bring all out right, and the finale will amply repay us for a little trouble.

Many think that when mildew shows its presence, sulphur is the only antidote, without any thing further than simply dusting the affected parts, or strewing a portion over the floor. This I grant will sometimes be sufficient; but it is

not merely the immediate contact that produces the remedial effect. The further spread of the Botrytis (?) may be arrested on particular spots with which the sulphur is in contact, but this will not suffice for the Oidium, for I have seen it push through a thick coating after the application had been repeated for several days together.

The fumes emanating from sulphur exposed to a high temperature, are the only radical cure that I have yet found out.

As mildew generally begins to appear towards the middle of July, in damp and close weather, we ought to be on our guard, and when storm or damp occurs, strew sulphur on the floor of the house, in the proportion of one pound to each fifteen or twenty square yards, and withhold water for the time being, keeping the house quite close, if cloudy, and allowing the temperature to rise somewhat higher for two or three days. This will cause the sulphur to throw off fumes, which are readily perceptible to the smell, and will check the further progress of the pest if present, or prevent its appearance if not so. I have used all the supposed remedies that I could collect a knowledge of, by way of experiment, without being able to discover any thing more than momentary relief, while the fumes of sul-

phur as above recommended have never failed with me, to immediately check, and finally overcome it. *There is no fear of sulphur doing harm to the foliage;—so long as ignition does not take place, it may be used with confidence.—Herein lies the secret. If allowed to burn, chemical action goes on, and sulphuric acid is produced, which in its then gaseous form will speedily destroy all foliage with which it comes in contact.*

There are several other sorts of fungi which are seen at times in the grapery, but which are not destructive, any further than by extending a mouldiness to the ripe fruit, or decaying leaves or branches, and which may be prevented by circulating a free current of air through the house, which at the time of the crop being at maturity, will be beneficial in all respects, as the vines then require to be ripened off. These last mentioned may be considered epiphytical, as they appear to feed upon a tendency to decay in the body upon which they vegetate; while the first and dangerous sorts are strictly parasites, germinating and progressing upon the living substance, but destroying the organization of that substance, in the course of their progression.

CHAPTER IX.

Insects—Quick Increase—Kinds injurious to the Grape-Vine—Description of, and how to exterminate.

WHERE the treatment described in the foregoing pages has been adhered to, there will be little trouble with insects. Notwithstanding, in some cases, these troublesome fellows do appear, and when not destroyed soon, do much mischief. If a plant of any kind is suffered to remain infested with any of these pests, you may bid good-bye to health or productiveness. Therefore be on the look-out, and when the enemy shows his advance guard, rest assured that if not speedily routed, a numerous army will follow. Attack his outposts, carry war into his centre, destroy his flank and rear, and completely annihilate him, or you will find that he will continue to annoy you. Give him no quarter, for he keeps no truce. So long as he has one helpmate of the opposite sex, he will persevere in bringing up his myriads of offspring, which

are soon drilled, and ready for active operation and renewed destruction.

Those insects which attack our present subject, are Red Spider (Acarus), several species of Coccus, as Brown Turtle, and White Scaly Bug, Mealy Bug, Brown, and White Tortoise Shell Scale,—Black, and Green Fly (Aphis), Thrips,—Fretters (Cycadæ), and occasionally the caterpillars of several moths.

The Red Spider is a very small dark red insect, which locates on the under side of the leaf, and if left long unmolested, will spread over the whole house, spinning a delicate network amongst which it travels with the greatest facility, feeding upon, poisoning and disfiguring the plant. It may be completely eradicated by the use of sulphur used as advised for mildew. Indeed, I doubt, if ever it will exist at all, if sulphur is exposed to a high temperature occasionally, *without being ignited.* I apply it at times in my plant houses, and am never troubled with either red spider or mildew, even amongst roses when forcing in the winter time, sprinkling a small quantity over the hot water pipes or coldest part of the flues, three or four times during the season. In the cold grapery, if the syringe or hose is used aright, there is not even occasion for

the sulphur, but when applied, it answers the double purpose of preventing both red spider and mildew.

The different species of scaly and mealy bugs, may be destroyed by the preparation recommended for the vines to be washed with in the fall, page 54. The scales generally adhere to the bark, and the brown ones are often so near the color of it, as to require a close look to see them; here they stick sucking the juices and ejecting their sugary excrescence, which clogs up the breathing pores of the leaves. The mealy bug is to be found in the crevices between the bark, in the joints, and amongst the bunches, in the form of little white and cottony looking substances, in which case it should be taken out with a small brush or other such instrument, for if left in its lurking places, the bunches amongst which it is located will be disfigured, and too dirty for use. The tortoise shell scale is a more solitary insect, in appearance like a small tortoise shell, and is found situated in the same places as the brown scale. It likewise lives upon the juices of the vine, and can be destroyed by the same means.

Aphidæ, or green and black fly, are small insects, sluggish in movement, having promi-

nent antennæ, a large abdomen, and a long proboscis with which they pierce the cuticle of the tender shoots, and draw out the sap, which quickly brings decrepitude into the advancing extremities. They are viviparous and gregarious, and increase amazingly fast.

Thrips, are small, active, linear shaped little fellows, congregating on and running over the under surface of the leaves, disfiguring them and eating the epidermis or outer covering; and the Fretters (a species of Cycadæ) move by short flights, or rather jumps when disturbed; they are somewhat linear and triangular in form, small and of a palish yellow color, and like the last described, feed on the outer covering of the leaves.

All the last three families can be destroyed by fumigating with tobacco, but care should be taken in the operation so as not to apply too much while the leaves are young and tender, as they are soon injured. An occasional glance over the house, will show if there are any caterpillars at work, by the jagged and eaten edges of the foliage. The best way to get rid of them is to pick them off with the hand.

If the insect world is "legion," and the generations quick in succession, they are easily kept

down in the grapery, and nothing but gross neglect or ignorance will permit them to gain ahead. Use water freely during the earlier periods of growth, swill it into all crevices of the house, and judiciously over the vines, and you may generally defy all the host of them. If after the fruit begins to ripen, they should make an attack, the sulphur and tobacco can be applied, when their comparatively small numbers will speedily be put to the rout.

THE END.

SYRACUSE, Oct. [illegible]

Whigs of the Third Assembly District, this afternoon, nominated Daniel P. Wood as their candidate.

ROCHESTER, Oct. 22, 1853.

The County Convention, to-day, [illegible] Davis Carpenter again nominated for Congress; William S. Bishop for Senate, and Edward A. Raymend for District Attorney.

From Cincinnati.

DESTRUCTIVE FIRE—LOW STATE OF THE OHIO RIVER —THE MARTHA WASHINGTON CASE.

CINCINNATI October 22, 1853.

A fire broke out this evening in the bakehouse of Robert Getty, situated near the centre of the block bounded by Main, Sycamore, Front, and Second streets. The flames communicated to the liquor stores of Wilshire, Bristol & Co., M. B. Ross, and N. H. & G. H. Davis, and are spreading rapidly. The rear of Mitchell & Rammelsburg's furniture establishment is burning, together with various warehouses on the alley running from Second to Front street.

The efforts of the firemen, so far, seem to have had no effect in checking the flames, which, at the present writing, eight o'clock, are raging fearfully, and it threatens to be the largest fire experienced for several years. Fortunately it has been raining all day, otherwise matters would be much worse.

SECOND DESPATCH.

CINCINNATI, Oct. 22—9 P. M.

The firemen have got control of the fire, and the flames will be confined within their present limits.

The following is a list of the buildings destroyed:—Robert Getty's bakery, Bristol, Wilshire & Co.'s liquor store, M. B. Ross's liquor store, N. H. & G. H. Davis' liquor store, George F. Davis & Co.'s pork house, N. M. Florer's pork house; the rear building of Mitchell & Rammelsburg's furniture warehouse, (the main building was saved;) several warehouses belonging to the Sycamore street buildings. The groceries of Cunningham, Wilson & Co., John Swazey & Co., and Ross & Pickers, were damaged somewhat, and were saved with great difficulty. The buildings on the east side of Sycamore street, including Pike's liquor establishment, were several times on fire, but by great exertions were saved.

Considerable rain has fallen here to-day, but not sufficient to raise the river.

Judge McLane has forbidden the publication of the trial of the Martha Washington case before the close of the proceedings.

The Fire at Louisville,

LOUISVILLE, Oct. 22, 1853.

The loss by the fire in this city yesterday is about $200,000, on which insurances to the extent of $160,000 were current. The following are some of the companies:—New York Home, $10,000; Hudson River, $5,000; Royal, of Liverpool, $10,000; the Ameri[illegible]

Western [illegible]
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but I saw n[illegible]
think I sho[illegible]
forward to [illegible]
deck, and th[illegible]
four female[illegible]
and saw no b[illegible]
I think I sho[illegible]
[witness her[illegible]
Colby, as Je[illegible]
there is no o[illegible]
of the officer[illegible]
gers; I did n[illegible]
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o'clock in t[illegible]
James H.[illegible]
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tleman wh[illegible]
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Mr. Jord[illegible]
what the r[illegible]
Witness—
the remai[illegible]

M. [illegible] has addr[illegible] it [illegible] Boitsoyl, in Paris, on the grape blight, in w[illegible] he gives an account of experiments made by him on the oidium. Considering the powerful antiseptic qualities of charcoal, which he had already used, mixed up with other substances, the idea struck him that it might be applied with advantage alone. He accordingly tried it on several vines, which were in a very bad state, with complete success. Charcoal, blown upon the grapes once only, was sufficient to make the oidium disappear, and in four or five days afterwards they had resumed their former vigorous appearance.

A[illegible] to the [illegible], the Austrian

Mildew on Grapes

Mr Grisons Recipe 1853- France-

Hydrosulphate of Lime. made as follows-

one pint flowers of Sulphur.

one pint fresh slaked lime- Mix intimately & put them into an iron pot with five pints of water & boil ten minutes stirring all the time, the pot is then taken off the fire & the mixture allowed to settle leaving about four pints clear this should be bottled for use- when used, each pint of the mixture should have about twelve & a half gallons of water added to it— The quantity to be applied is very little, one pint is sufficient for a wall 50 f.t long & 12 f.t high or 100 sq ft by 6

Three applications will be sufficient, two are generally sufficient- The first one just before the vines are in flower, another when the Grapes are formed, and a third only if the Oidium should reappear

Note. Try this mixture on Gooseberry bushes



